

Does the Effect of Procrastination on Academic Performance Differ Based on Course Format?

Samuel D. Lee

University of Minnesota

Does the Effect of Procrastination on Academic Performance Differ Based on Course Format?

Online courses have become increasingly popular over the years. Roughly one third of all students enroll in online courses, and that number seems to be rapidly increasing (Jaggars & Xu, 2010). Because of their popularity, researchers should examine the pros and cons of online courses. One issue with online courses is a higher attrition rate. Students complete online courses less often than they complete in-person courses (Moody, 2004). Because success varies across course format, an important inquiry is determining who will earn strong grades when taking an online course.

Researchers have attempted to predict online course performance by using tests and questionnaires. These tests and questionnaires vary in length and content. The eLearning Readiness Survey (Wladis & Samuels, 2016) is used by community colleges to determine if students would be a good fit for online courses. If students do not score well on the eLearning Readiness Survey, they are encouraged to take additional steps to prepare for online courses or to avoid them. Wladis and Samuels found that students who scored well on predictive measures, such as the eLearning Readiness Survey, tended to do well in courses regardless of course format. Therefore, while using the eLearning Readiness Survey appears to be a promising idea, the survey's lack of discriminatory power could mean it does not successfully do the job it is supposed to do. This problem also is likely true of other measures that attempt to do the same thing, such as the Online Learning Readiness Survey (Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, & Marczynski, 2011), which focused primarily on Internet use and accessibility.

The lack of discriminatory power identified by Wladis and Samuels (2016) is unfortunate. A questionnaire that could predict whether a student would perform better in an in-person or online course could be useful because it could be used to inform students about how to

capitalize on their respective strengths in terms of course type. In order to create a questionnaire that can discriminate between strong online and in-person students, the differences between the course types should be examined thoroughly. Some intuitive differences, such as computer literacy, have been included in questionnaires to predict online course performance (Dray et al., 2011), but even those questionnaires could lack discriminatory power.

One of the many differences between online and in-person courses is the structure of the course. Traditional in-person courses tend to be highly structured; students typically attend the class for a set number of days per week at a regular time. For example, an in-person math course might meet for an hour a day, five days per week. The regular meetings could help students keep the information they learned fresh in their minds and remind them to keep up with major upcoming assignments. The structure of an online course can be quite different. Oftentimes, students simply are given a list of assignments and due dates at the beginning of the week, and then they do everything for the class, such as watching online lectures, writing papers, making discussion posts, and completing other homework assignments, at any time before the due date. For example, in an online sociology course, the instructor might say discussion posts are due Thursday and quizzes are due Sunday. Beyond the directions and discussion posts, the student might not have any other interactions with their classmates or instructor. The freedom that comes from taking an online course has the benefit of allowing students to do coursework whenever is most convenient for them, but it also means that if students procrastinate, they will end up with a large amount of work at the end of each week and have to play “catch up.” Unsurprisingly, this could hurt students' grades and mental well-being. Situations like this are possible in both online and in-person classes, but the issue might be amplified in an online class due to the less rigid structure.

Because of the major structural differences between in-person and online courses, we thought that measures of procrastination might better predict success for a student taking an online course than a student taking an in-person course. Multiple measures have been developed to assess procrastination, which is putting off something that needs done. The Yockey Short Form of the Academic Procrastination Scale (APS; Yockey, 2016) is a measure of procrastination in an academic setting, while the Tuckman Procrastination Scale (Tuckman, 1991) is an assessment of general procrastination. Academic procrastination is procrastination in an educational setting, whereas general procrastination takes place across all settings. Both the Yockey Short Form of the APS and the Tuckman scale have been shown to be valid and reliable (Tuckman, 1991; Yockey, 2016).

Procrastination has been demonstrated to be a predictor of academic success (Kim & Seo, 2015), but we thought it might be able to predict academic success better for students in one type of class than another. We thought this because the looser structure in online courses could mean heavy procrastination would lead to a large amount of work in a small amount of time. Thus, our hypothesis was as follows: students who scored high on measures of procrastination would do more poorly in online courses than students who were in in-person courses with similar procrastination scores. In other words, we predicted that high procrastination scores would be more detrimental for online course students than they would be for in-person course students.

Method

Participants

Participants consisted of 855 students enrolled in the University of Minnesota's Introduction to Psychology course (PSY 1001) in Fall 2016. That semester, 1,120 students completed the course. Of those, 904 took the first week survey that contained the survey items

used for this project. Thirty-nine students were excluded because they were enrolled in the honors section of the course. Introduction to Psychology has in-person sections, hybrid sections, and an online section. Students in the in-person sections attend lectures and discussion sections. Students in the hybrid sections watch lectures online and attend discussion sections. Students in the online section watch lectures and participate in discussions online. Exams, quizzes, and other work are the same for all sections. Additionally, students in the in-person section also have access to the online lectures. For the in-person sections, 435 students completed the survey items pertaining to this project; 280 students from the hybrid sections completed the items and 140 students from the online section fully completed the surveys for this project.

Materials and Procedure

All Introduction to Psychology students at the University of Minnesota were asked to take a first week survey at the beginning of the semester to assess personality traits and behaviors for course credit. For this project, three different questionnaires were given to the Introduction to Psychology students as part of that first week survey, consisting of 19 items overall (see Appendix). The Yockey Short Form of the APS (Yockey, 2016) was used to assess academic procrastination. The Yockey Short Form contains five items. An example item is *When given an assignment, I usually put it away and forget about it until it is almost due*. Students rated themselves on a 1 to 5 Likert scale based on how much they agreed with the statement.

Six of 35 items from the Tuckman Procrastination Scale (Tuckman, 1991) were included to assess general procrastination. Only six Tuckman Procrastination Scale items were included to minimize time spent on the survey. The items were chosen based on how well we thought they fit the definition of procrastination, and we assessed the reliability and validity of the abridged measure. An example of an included item from the Tuckman Procrastination Scale is *I manage to*

find an excuse for not doing something. The Tuckman Procrastination Scale items were scored similarly to the Yockey Short Form items. We do not expect the type of procrastination measured to be a significant factor, but measuring both academic and general procrastination allows us to be more thorough.

In addition to the procrastination measures, we included eight of 12 eLearning Readiness items (Wladis & Samuels, 2016). We selected only eight to minimize time spent on the survey, and the items were chosen based on which items we thought would have the strongest relationship with online course success. We used the eLearning Readiness Survey to compare the course delivery modes using other possible predictors of class performance.

The questionnaires were not the only methods used to assess procrastination. Students enrolled in Introduction to Psychology were given a month to complete the first week survey. We recorded how long students waited to complete the questionnaire and used those values as indicators of procrastination to assess the convergent validity of our other measures of procrastination. We also recorded how long online students took to make their first discussion post each week. We used median instead of mean time to first post across the semester to reduce the effect of outliers. Like number of days to complete the questionnaire, how long students waited to make their discussion posts was a method of assessing convergent validity for procrastination.

Results

The results of the study did not support the hypothesis. The correlations between procrastination and course grade was lower for the students in the online section than they were for students in both other modes of delivery. Online section grade and the APS correlated $-.076$ ($p = .372$) and online section grade and Tuckman Scale correlated $-.035$ ($p = .685$), while in-

person section grade and the APS correlated $-.263$ ($p < .001$), and in-person section and the Tuckman Scale correlated $-.165$ ($p = .001$). The correlations between measures of procrastination and performance in the online section were weak and were not statistically significant, unlike the correlations for the other modes of delivery (see Table 1 for more details).

Previous researchers found that course grades could be predicted by measuring procrastination (e.g., Kim & Seo, 2015), and our data confirms those findings. Both self-report measures of procrastination, the Yockey Short Form of the APS and the Tuckman Scale, were negatively correlated with course performance and were significant in all sections aside from the online section (see Table 1). This means that the more students procrastinate, the lower their grades will tend to be.

Number of days to complete the questionnaire correlated with the Yockey Short Form of the APS ($r = .225$, $p < .001$) and the Tuckman Scale ($r = .185$, $p < .001$). These correlations indicate that the measures of procrastination used have convergent validity; as the number of days taken to complete the survey increased, the procrastination scores also increased. Additionally, median time until first discussion post correlated with both measures. Median time correlated with the Yockey Short Form of the APS $.357$ ($p < .001$) and with the Tuckman Scale $.369$ ($p < .001$), which is further evidence of the measures' validity (see Table 2 for more information).

The reliability of each measure also was assessed. Cronbach's Alpha for the Tuckman Procrastination Scale was $.780$. For the APS, Cronbach's Alpha was $.860$, and for the eLearning Readiness Survey, Alpha was $.498$. Alpha for both the Tuckman scale and the APS was over $.7$, which is the standard for decent reliability. Cronbach's Alpha is a measure of internal

consistency. The eLearning Readiness Survey measures multiple facets of online readiness, and we did not use the entire scale, which helps to explain why Alpha is so low.

Discussion

The results did not support the hypothesis. Measures of procrastination do not seem to differentiate significantly between successful online and in-person students. These null results could be due to multiple reasons. It could be that the differences in structures across course delivery mode do not lead to differences in the importance of procrastination. Even if the structures are different, perhaps procrastination is just as important for success in-person courses as it is in online courses. Another plausible reason for the null results is the specific course used in the study. All students assessed were enrolled in the in-person, hybrid, or online sections of the Introduction to Psychology course at the University of Minnesota. Many aspects of the course, such as essay work, quizzes, and exams are identical across sections. Additionally, the students in the in-person section had access to the same online lectures as the students in the hybrid and online sections. Because of these similarities, the differences in structures between the in-person and online sections of the course could be less extreme than the differences between other in-person and online courses. Future researchers should attempt to remedy this issue by examining a sample with more extreme structural differences between online and in-person courses.

Another possible flaw with our study that could have resulted in finding no differences is the measurement of performance used. We used final course score (0-730) as the outcome variable; however, final course score might not have been the best measure to use due to variance in attrition rates. Attrition is a larger issue in online course than it is in other course formats (Moody, 2004). Students are significantly more likely to drop out of online courses than they are to drop out of in-person courses. Perhaps students in the online section who faced issues

resulting from procrastination dropped the course, but students who procrastinated in the in-person section did not drop the course. Our data support that possibility. The minimum final course scores in the in-person and hybrid sections were much lower than they were in the online section. If online procrastinators were more likely to drop the course, the effect of procrastination in the online section would be diminished in a way that was not so in in-person courses. If the outcome variable used took attrition into account, the results might have been different. Similarly, not all students completed the survey, and it is possible that the students who did not complete it were poorer students and higher procrastinators. Future researchers should consider this attrition issue when operationally defining performance.

One last possible explanation for the results is self-selection. We did not randomly assign students to each course section. Students enrolled themselves based on availability and preference. For example, if students who are good at dealing with the repercussions of heavy procrastination (e.g., a large amount of work in one night) tended to sign up for the online section, the effect of procrastination in that section would be diminished, even if procrastination would have a larger effect for the typical student. Future research in this area should attempt to address this issue by studying the characteristics of students who register for online courses instead of in-person courses.

The lack of support for the hypothesis was likely not a result of the measures used. The correlations between number of days before taking the questionnaire and the Yockey Short Form of the APS ($r = .225$) and with the Tuckman scale ($r = .185$) are evidence that the measures were valid. We also looked at how long students took to make their first discussion posts, and that correlated with the APS ($r = .357$) and the Tuckman Scale ($r = .369$), which is further evidence of the measures' validity. Though the correlations seem weak to moderate, they are probably so

because the scales are being compared to single-item measures (days to complete the survey and median time till until first post), not because of a lack of validity. The measures also appear to be reliable. The inter-item reliabilities of the APS and the Tuckman scale are high given that they are abridged versions. The low inter-item reliability of the eLearning Readiness Survey ($\alpha = .498$) is likely the result of the measure examining more than one construct and the inclusion of only certain items and not the entire measure. Therefore, the low alpha is not surprising or a concern. Other types of reliability, such as test-retest or parallel forms reliability would be more appropriate for a measure such as the eLearning Readiness Survey. However, we did not acquire the data necessary to measure reliability in those ways.

Despite Wladis and Samuels (2016) findings that the eLearning Readiness Survey failed to discriminate between online and in-person course performance, the eLearning Readiness Survey did seem to have some discriminatory power here. The correlation between the eLearning Readiness Survey and online course performance was stronger than the correlation between the eLearning Readiness Survey and in-person course performance. However, the difference was not great, and the measure correlated with performance in the hybrid section even lower than the completely in-person section. In its current state, the eLearning Readiness Survey does not have practically significant discriminatory power, but the individual items on the scale and the constructs they examine should be researched further to determine which items can best differentiate between successful in-person students and successful online students.

Conclusions

The results of this study are not conclusive; before concluding that procrastination is not a good variable for discriminating between which type of class students should take, the flaws in this research should be addressed. In addition to correcting for the issues detailed in the

discussion section of this paper, procrastination should be assessed empirically instead of using self-report measures. Though the results of the present study indicate that researchers should be hesitant to use procrastination as a discriminatory variable, more research must be done on the topic before the results are conclusive. Further research on procrastination and other predictor variables, such as computer literacy and online communication, must be done for measure such as the eLearning Readiness Survey to be able to discriminate successfully between strong online and in-person students.

References

- Dray, B., Lowenthal, P., Miskiewicz, M., Ruiz-Primo, K., & Marczyński. (2011). Developing an instrument to assess student readiness for online learning: A validation study
Distance Education, 32(1), 29-47.
- Jaggars, S., & Xu, D. (2010). Online learning in the Virginia community college system.
Retrieved from Community College Research Center
<http://ccrc.tc.columbia.edu/media/k2/attachments/online-learning-virginia.pdf>
- Kim, K., & Seo, E. (2015). The relationship between procrastination and academic performance: A meta-analysis. *Personality and Individual Differences*, 82, 26-33. doi: 10.1016/j.paid.2015.02.038
- Moody, J. (2004). Distance education: Why are attrition rates so high? *Quarterly Review of Distance Education*, 5(3), 205-210.
- Tuckman, B. W. (1991). The development and concurrent validity of the Procrastination Scale.
Educational and Psychological Measurement, 51, 473-480.
doi:10.1177/0013164491512022
- Wladis, C., & Samuels, J. (2016). Do online readiness surveys do what they claim? Validity, reliability, and subsequent student enrollment decisions. *Computers & Education*, 98, 39-56. doi: 10.1016/j.compedu.2016.03.001
- Yockey, R. (2016). Validation of the short form of the Academic Procrastination Scale. *Psychological Reports*, 118, 171-179. doi:10.1177/0033294115626825

Appendix

Questionnaire Items

From E-learning readiness survey questions in Wladis and Samuels (2016):

1. As a reader, I would consider myself:
 - a. Good, I have no trouble reading and understand text
 - b. Average, I usually understand text without help
 - c. Below average, I often need help to understand text
 - d. Poor, I am not a good reader

2. If a new subject is introduced or I am given an assignment:
 - a. I usually don't need much help understanding it
 - b. I am comfortable e-mailing an instructor to ask for clarification
 - c. I am uncomfortable e-mailing an instructor, but do it anyway
 - d. I never approach an instructor to admit I don't understand something

3. Regular face-to-face contact with my professor is:
 - a. Essential to my understanding a concept
 - b. Would be helpful to my understanding a concept
 - c. Not essential to my learning, as long as I am in contact with him/her
 - d. Not essential to my learning

4. I learn better when I listen to my professor explain a concept rather than reading from the course materials:
 - a. Always true
 - b. Frequently true if the subject is difficult for me
 - c. Occasionally true, but I can usually learn by reading text
 - d. Rarely true even if the subject is difficult

5. Expressing my thought in writing is:
 - a. Easy for me
 - b. Usually easy, but I need practice
 - c. Sometimes difficult
 - d. Almost always difficult

6. I believe participating in discussions through online forum or through e-mail:

- a. Would help me learn
- b. Could potentially help me learn, but I'm not certain
- c. I've never tried it, so I'm not certain
- d. Would not help me learn

7. I would classify myself as someone who is generally:

- a. Self-motivated and always gets things done on time
- b. Self-motivated and sometimes gets things done ahead of time
- c. Needs reminding to get things done on time
- d. Puts things off until the last minute or doesn't complete them

8. Planning the order of class tasks and following a schedule is:

- a. Easy for me
- b. Sometimes difficult, but I will make time for my class
- c. Often difficult due to my work and family obligations
- d. Usually difficult for me

From the Tuckman Procrastination Scale (Tuckman, 1991):

How much are the following indicative of yourself?

1 = That's not me for sure

2 = That's not my tendency

3 = That's my tendency

4 = That's me for sure

1. I needlessly delay finishing jobs, even when they're important.

2. When I have a deadline, I wait until the last minute.

3. I keep putting off improving my work habits.

4. I manage to find an excuse for not doing something.

5. Whenever I make a plan of action, I follow it.*

6. I always finish important jobs with time to spare.*

Where * indicates a reverse-coded item.

From the Academic Procrastination Scale (Yockey's short form, 2016):

How much do you, yourself agree to the following statements? (Scored on a 1 to 5 scale where 1

= Disagree and 5 = Agree)

1. I put off projects until the last minute.
2. I know I should work on schoolwork, but I just don't do it.
3. I get distracted by other, more fun, things when I am supposed to work on schoolwork.
4. When given an assignment, I usually put it away and forget about it until it is almost due.
5. I frequently find myself putting important deadlines off.

Table 1

Correlations Between Measures of Procrastination and Performance

	Short Form of APS	Tuckman	eLearning
Short Form of APS			
Tuckman	.757***		
eLearning	-.381***	-.38***	
Online Grade	-.076	-.035	.272**
Hybrid Grade	-.242***	-.196**	.157**
In-Person Grade	-.263***	-.165**	.217***

** $p < .01$. *** $p < .001$.

Table 2

Correlations Between Measures of Procrastination

	Short Form of APS	Tuckman	eLearning
Tuckman	.757***		
eLearning	-.381***	-.28***	
#Days	.225***	.185**	-.093**
First Post Med.	.357***	.369***	-.061

** $p < .01$. *** $p < .001$.